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UserID: TDixon

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Search Note

09/390,937

Filed 9/7/99

State LDCs and associate members in the surrounding region. She has been serving in an engineering management capacity in various assignments with NYGAS for 11 years.

Albert W. Gershman is principal research engineer for gas engineering operations research, KeySpan Energy Delivery, Brooklyn, New York. He has been with the company for 22 years in various engineering positions, and holds several patents. Gershman is a member of AMRA, and vice-president of ENTELEC, the Energy Telecommunications and Electrical Association.

LITERATURE CITED

(1.) Landsberg Engineering, P. C., "Feasibility Study of Pay For Use Metering in New York State," presentation mode to project sponsors, March 1998.

(2.) The final report from this study is available for purchase from NYGAS.

INDUSTRY CODES/NAMES: BUSN Any type of business; OIL Petroleum, Energy Resources and Mining
DESCRIPTORS: Energy industry--Finance; Gas utilities--Finance; Gas-meters --Product development; Testing and measuring equipment industry--Product development
GEOGRAPHIC CODES/NAMES: 1USA United States
PRODUCT/INDUSTRY NAMES: 4920000 (Gas Utilities); 3824220 (Gas Meters)
SIC CODES: 4920 Gas Production and Distribution; 3824 Fluid meters and counting devices
NAICS CODES: 22121 Natural Gas Distribution; 334514 Totalizing Fluid Meter and Counting Device Manufacturing
FILE SEGMENT: TI File 148

```
?
PLEASE ENTER A COMMAND OR BE LOGGED OFF IN 5 MINUTES
?s s1 and (visa or mastercard or (credit (w) card))
              524  S1
           211315  VISA
           107256  MASTERCARD
          2791122  CREDIT
          1456565  CARD
           457768  CREDIT(W)CARD
      S3      150  S1 AND (VISA OR MASTERCARD OR (CREDIT (W) CARD))
?s s3 and central and billing
              150  S3
          4024691  CENTRAL
           372407  BILLING
      S4       11  S3 AND CENTRAL AND BILLING
?type s4/3,abs/all
>>>"ABS" is not a valid format name in file(s): 2, 9, 15-16, 20, 35, 65,
   77, 99, 148, 160, 233, 275, 473-475, 593, 621, 623-624, 636, 810, 813
?type s4/3,ab/all
>>>No matching display code(s) found in file(s): 65, 593, 623-624, 810, 813
```

4/3,AB/1 (Item 1 from file: 624)

0548781

Information superhighways are under construction at many electric utilities

Electrical World February, 1994; Pg 5; Vol. 208, No. 2
Journal Code: EW ISSN: 0013-4457
Section Heading: TELECOMMUNICATIONS
Word Count: 5,234 *Full text available in Formats 5, 7 and 9*

BYLINE:
Herbert A. Cavanaugh, Executive Editor

4/3,AB/2 (Item 1 from file: 636)

04078607 Supplier Number: 53646258
Regional Update.
South America Report, v4, n6, pNA
Feb, 1999
Language: English Record Type: Fulltext
Document Type: Newsletter; Trade
Word Count: 2715

4/3,AB/3 (Item 2 from file: 636)
DIALOG(R)File 636:Gale Group Newsletter DB(TM)

02042825 Supplier Number: 43716643
RADIO FINDS STRONG SUPPORT IN ENERGY CONSERVATION USES
Communications Daily, v13, n51, pN/A
March 17, 1993
Language: English Record Type: Fulltext
Document Type: Newsletter; Trade
Word Count: 1529

4/3,AB/4 (Item 1 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

01165162 Supplier Number: 42133727
XANcomm Announces lSDN-based Utility Control System
News Release, p1
June 5, 1991
Language: English Record Type: Fulltext
Document Type: Magazine/Journal; Trade
Word Count: 708

4/3,AB/5 (Item 1 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)

01710231 Supplier Number: 42133727
XANcomm Announces lSDN-based Utility Control System
News Release, p1
June 5, 1991
Language: English Record Type: Fulltext
Document Type: Magazine/Journal; Trade
Word Count: 708

4/3,AB/6 (Item 1 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

10567799 SUPPLIER NUMBER: 21212534 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Bringing interactivity to the bill. (includes related articles)
Grzanka, Len
Public Utilities Fortnightly (1994), 136, n18, S8(9)
Oct 1, 1998
LANGUAGE: English RECORD TYPE: Fulltext; Abstract
WORD COUNT: 3687 LINE COUNT: 00305

ABSTRACT: Electric utilities are considering alternative **billing** methods, following practices explored by telephone companies after they were deregulated. Options include software solutions, "smart" cards similar to prepaid phone cards, third-party **billing** , pay-by-phone, and payment through the Internet. Direct **debit** programs have been shown to be the most effective method of electronic banking.

4/3,AB/7 (Item 2 from file: 148)

DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2002 The Gale Group. All rts. reserv.

08777451 SUPPLIER NUMBER: 18378507 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Products and services. (part 10, from Water Meters, Residential through Miscellaneous)(1996 Municipal Index Special issue)(Directory)
American City & County, v111, nSPEISS, p288(9)
April 30, 1996
DOCUMENT TYPE: Directory ISSN: 0149-337X LANGUAGE: English
RECORD TYPE: Fulltext; Abstract
WORD COUNT: 10068 LINE COUNT: 00893

ABSTRACT: In this section of the purchasing guide for municipalities, products and services are listed alphabetically. Under each product entry are the names of companies, a brief description of services if applicable, and locator information.

4/3,AB/8 (Item 3 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2002 The Gale Group. All rts. reserv.

08124425 SUPPLIER NUMBER: 17389671 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Plastics technology: manufacturing handbook & buyers' guide 1995/96.(Buyers Guide)
Plastics Technology, v41, n8, pCOV(941)
August, 1995
DOCUMENT TYPE: Buyers Guide ISSN: 0032-1257 LANGUAGE: English
RECORD TYPE: Fulltext
WORD COUNT: 174436 LINE COUNT: 15187

4/3,AB/9 (Item 4 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2002 The Gale Group. All rts. reserv.

07704260 SUPPLIER NUMBER: 16447767 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Wireless '95. (Cellular Telecommunications Industry Association 10th annual Convention and Exposition scheduled for FEbruary 1-3, 1995 at the Ernest N. Morial Convention Center in New Orleans, Louisiana)
Cellular Business, v12, n2, p24(60)
Feb, 1995
ISSN: 0741-6520 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
WORD COUNT: 31135 LINE COUNT: 03166

4/3,AB/10 (Item 5 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
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06424920 SUPPLIER NUMBER: 13550556 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Radio finds strong support in energy conservation uses. (Energy Department's radio-based automatic meter reading technology proposal)
Communications Daily, v13, n51, p3(3)
March 17, 1993
ISSN: 0277-0679 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
WORD COUNT: 1652 LINE COUNT: 00134

4/3,AB/11 (Item 6 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2002 The Gale Group. All rts. reserv.

02975033 SUPPLIER NUMBER: 04479208 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Firms unveil smaller versions of older systems in Atlanta. (World Energy Engineering Congress) (product announcement)
Energy User News, v11, p1(11)
Oct 20, 1986
DOCUMENT TYPE: product announcement ISSN: 0162-9131 LANGUAGE:

ENGLISH RECORD TYPE: FULLTEXT
WORD COUNT: 9171 LINE COUNT: 00723
?type s4/3,9/6

4/9/6 (Item 1 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

10567799 SUPPLIER NUMBER: 21212534 (THIS IS THE FULL TEXT)
Bringing interactivity to the bill. (includes related articles)
Grzanka, Len
Public Utilities Fortnightly (1994), 136, n18, S8(9)
Oct 1, 1998
LANGUAGE: English RECORD TYPE: Fulltext; Abstract
WORD COUNT: 3687 LINE COUNT: 00305

ABSTRACT: Electric utilities are considering alternative **billing** methods, following practices explored by telephone companies after they were deregulated. Options include software solutions, "smart" cards similar to prepaid phone cards, third-party **billing** , pay-by-phone, and payment through the Internet. Direct **debit** programs have been shown to be the most effective method of electronic banking.

TEXT:

Utilities are following the paths forged by deregulated phone companies, which often means buying packaged software to handle **billing** ; few develop their own systems. Many utilities are outsourcing parts or all **billing** processes. Some handle **billing** for other companies to recoup in-house system costs.

Consolidated **billing** involves a variety of products and services, such as **credit card** payment, direct payment and Internet bill presentation and allows customers to make payment directly or electronically.

Other payment methods--smart cards, for example--are taking hold in telecommunications, but are resisted by customers of electric and gas utilities. (See sidebar, "Carrying the Torch for Smart Cards.") Experiments such as ATM-like kiosks for customer cash payments have simply flopped.

Yet the statistics support indications that utility **billing** is about to undergo a major transition. U.S. consumers collectively pay 75 million bills a month, according to Tom Roberts, vice president of International **Billing** Services Inc.; electric utilities collect more than $200 billion annually, according to the Edison Electric Institute. Both figures are expected to grow rapidly.

Regulated Environments

In noncompetitive environments, regulators allow utilities to recover a part of their capital investments through water, gas and electricity rates. The greater the investment in assets, the larger the allowed return on investment.

By purchasing data processing equipment for **billing** , the utility increased its asset base and therefore raised its total allowable return. This is one reason most utilities historically have kept their **billing** process in-house. Another reason was reluctance to experiment with new **billing** processes.

As the industry is restructured and **billing** , in some states, is deregulated, utilities are scrutinizing their **billing** practices.

Right now, many electric and gas utilities still do their own **billing** , says Roberts of IBS (www. **billing** .com) in El Dorado Hills, Calif., one of the largest statement processing firms in the U.S. But all that's changing as utilities look for more efficient **billing** solutions such as outsourcing. Another option utilities are taking advantage of is off-the-shelf software solutions rather than building systems from scratch, Roberts adds.

According to David Cain, project manager for **billing** and customer operations systems at the Electric Power Research Institute, California's deregulation rules stimulate outsourcing or use of packaged software. "The cost of **billing** is not included in the rate base," he says. "It's up for grabs at about $3 or $4 per customer per month."

In the past, companies that provide sophisticated **billing** software to the telecommunications industry shied away from marketing to the

electric and gas industries, according to John Hart, vice president of marketing of Saville Systems (www.savillesys.com).

"But now, utility executives realize that they are not in the business of developing software," Hart says. "And packaged software can reduce the time to market of new products. In the old days, they concentrated on return on investment. Now they don't. It's a different answer now when they consider whether to build a system for $400 million, or to buy one for $25 million"

Third-Party Solutions

Bill Mayer, customer applications manager at the Edison Electric Institute in Washington, D.C., notes that the older legacy **billing** systems at most utilities cannot incorporate features needed for new business opportunities (see sidebar, "EnergyOne Provides a Lesson").

In theory, convergent **billing** provides a single statement that includes charges for all products and services provided by the vendor and its subcontractors--electricity, gas, telecom, wiring protection, home security and other services.

Hart explained some complications in convergent **billing** . First, the system must be able to offer discounts across product lines and usage. For example, the customer can earn a discount when purchasing electricity, long distance and Internet access from the company, and additional discounts apply across product lines if usage of any product reaches a certain level. Second, taxes are a major problem. Utility taxes vary among jurisdictions, state taxes differ and sales taxes may apply at varying rates according to location. Saville handles the tax problem by keeping the consulting firm Hagler Bailly Inc. of Arlington, Va., on retainer to modify the tax tables in the **billing** system.

"The broad trend is that for the first time in the history of commerce, consumers are choosing how they get their bill," says Roberts.

Customer preferences drive convergent **billing** , and this is another complication. The customer may not want all charges on a single bill, but may want some or all items billed separately, or on different dates. Hart says that because of this trend, customer service representatives have to be better educated, trained for a longer period and provided higher salaries. But because the job is more intellectually challenging, service representatives tend to have greater longevity, Hart says.

Hart and Roberts cite a lesson learned from the experiences of telecommunications companies: Don't fight churn. "It's going to happen," Hart says. "Learn how to manage it. The person who buys on price alone will switch companies. The high-end buyer and early adopter will pay more, but they want more value. When you fight churn with price wars, everyone but the consumer loses."

By allowing customers to switch suppliers on only one day each month, the day when the customer meter is read, California and Massachusetts avoid the problem of determining which supplier can bill for energy through the month, according to Meyer at EEI.

Savine's system, which runs on IBM AS/400 and Hewlett Packard RS6000 Unix minicomputers, costs from $1.9 million for 150,000 customers to $10 million to $20 million for 10 million to 15 million customers. Saville also will act as a service bureau to handle a utility's **billing** for a cost of about $1 per bill, not including the cost of fulfillment (envelope stuffing, labeling and mailing.) For regulated utilities that may want to buy and install the system, Saville offers onsite facilities management for slightly more than $1 a bill.

While some companies use third parties to outsource their **billing** , utilities with sophisticated systems are insourcing **billing** from other utilities. Florida Power Corp., for example, installed a new customer information system in 1995, and offers **billing** services to other utilities to recoup part of the cost of its information system, according to Dave Tomlinson, manager of strategy and quality assessment.

Pay-By-Phone & Direct Payment

Convergent **billing** and complex systems may be today's state of the art, but some utilities have experimented with simpler, innovative systems to reduce **billing** costs. Last year, Consolidated Edison Company of New York installed a pay-by-phone system from Intell-A-Check Corp. (www.icheck.com) in Kearney, N.J., according to Michael J. Spall, spokesman.

Originally developed for bill collectors, the system prints and deposits a check drawn on a customer's bank account from information

provided by the customer. Spall says Con Edison modified Intell-A-Check's software to let customers use the telephone keypad to enter their ConEd account numbers, the amount of the bill, the American Banking Association bank identification number on a check or deposit slip, and their checking account number. The pay-by-phone service is gaining popularity, Spall says.

Con Edison, Bay State Gas Co. and many other utilities have set up a direct- **debit** program that automatically deducts utility charges from subscribers' checking accounts on a predetermined day of the month. According to Carol Collins, vice president of customer services delivery at Bay State Gas in Westborough, Mass., the service is popular with about 5 percent of customers, primarily the elderly and people who have a history of paying bills on time.

According to CyberCash, a company that provides direct-payment services, direct **debit** programs are the most successful form of electronic banking today, with 37 percent of households using it. Bay State Gas will soon test a program that allows people to pay non-gas charges with **credit** cams. If the program is successful, the company will open it to all charges by the end of the summer, Collins says.

Internet Bill Presentment

Providing bills on a World Wide Web site began in the utility industry with small telecommunications companies, according to Mike Lanza, president of Just In Time Solutions Inc. (www.justintime.com), a San Francisco company that develops Web servers for utility **billing** . Just In Time's servers take data generated by the utility's **billing** system and generate the Internet bill according to a company's specifications.

Lanza says that while the major telecommunications companies were pondering whether to approach regulators for permission to launch an Internet **billing** trial, the smaller telcos and ISPs went ahead and did it. "They found that it's O.K., and now everyone is doing it;' Lanza says.

"In general, the commission tends to let technology innovations come from the marketplace as long as the bill meets confidentiality and customer information accuracy requirements, and the consumer is protected;' says Tina Horner, strategic planning analyst at the California Public Utilities Commission in San Francisco.

Utilities are taking many different approaches to Internet bill presentment and payment.

Some, like Con Edison, use internal resources. ConEdison modified its pay-by-phone system to accept customer payments over the Internet. Spall said the company's Web site lets customers enter their own meter readings, reducing meter reading costs, and provides payment and usage history for gas and electricity. It also serves a marketing function, giving customers links to ConEd's unregulated subsidiaries.

Other utilities hire third-party site developers like Just In Time Solutions to develop their Internet bill presentment and payment systems. Or like **Central** Illinois Power and Light, they use software from Intelligent Environments in Burlington, Mass., to interface their Web sites to their legacy **billing** systems.

Utilities also have to choose whether to host the Web site on an in-house server, to let a third-party host and manage it or to load the site on the utility's ISP's servers. Aside from where to locate the server, the question of handling payment is gaining complexity as a variety of computer industry and financial firms fight to gain market share in electronic commerce.

Billing Standards

When a utility offers an electronic bill payment option on its Web site, someone has to handle the back-end processing of payments, which includes clearing the payment through the customer's financial institution and crediting the utility's account. Moreover, developing the security and privacy features necessary for electronic bill payment can cause serious delays.

Many utilities have decided to use existing electronic commerce products, but recent announcements have made the choice of product and vendor complex. Electronic-commerce is now in flux as giants of the computer and financial services industries announce new products, create confusing alliances and jockey for market share.

Founded in 1994, CyberCash (www.cybercash.com) was one of the first processors of electronic payments. (EEI introduced the CyberCash program to its member utilities on June 1, 1998, promising utilities a rebate for each payment made with the service.)

In January 1997, Intuit, developer of Quicken personal financial software; Microsoft; and CheckFree, a billpaying service, announced the Open Financial Exchange specification for online bill paying. Sensing a profit opportunity in the online **billing** arena, Microsoft later formed a joint venture with First Data Corp. called MSFDC (www.msfdc.com) for electronic bill paying in June 1997.

Not to be outdone, IBM Corp. and 17 major banks formed the Integrion Financial Network (www.integrion.net) to compete with MSFDC. Integrion acquired the interactive banking and electronic commerce operations of **Visa** Interactive, and in September 1997, formed a joint venture with CheckFree. Integrion plans to merge its Gold Standard bill-paying specification with OFX in August. However, Integrion is primarily a customer-to-financial institution interface so that banks do not lose the lucrative financial transaction clearing business on the Internet to Microsoft.

Integrion does not include options for bill presentment by third parties such as utilities, according to Lanza.

MSFDC functions similarly to an online bill consolidator, according to Lanza and MSFDC literature. The utility customer logs onto MSFDC with a personal financial package such as Microsoft Money or Intuit's Quicken, and receives **billing** detail from MSFDC. Since the customer is using the proprietary MSFDC system, the utility has no direct contact with the customer, and loses the benefits of linking the bill to other business opportunities. Nevertheless, ConEd is currently testing MSFDC in a trial as the utility liked the full range of features in the product, Spall says. Spall notes that the current bill paying option at ConEd's Web site is a direct link to ConEd and does not go through an intermediary like MSFDC.

Other utilities committed to using MSFDC include Arizona Public Service, Nevada Power, and Southern California Edison, according to MSFDC.

On the other hand, using open **billing** products like Just In Time's BillCast OFX bill presentation server provides direct contact between the utility and customers wanting to pay bills at the utility site. With this approach, the customer has to visit each utility's site individually each month to pay bills. Another opportunity for customers is to subscribe to a bill consolidation service, which displays all of the customer's bills at the same Web site and allows individual payment authorization. MSFDC is similar to a bill consolidator but with additional features and easy access through Microsoft's Money personal financial management software.

Jupiter Communications, a New York City communications consulting firm, estimates that 4.5 million U.S. households used online banking services during 1997, and projects that more than 13 million households will bank online by 2000. Not only will utilities save money by **billing** electronically--3 cents per bill at a Web site versus $2 per bill through statement mailing and pay-by-check --but they can use the Web site to strengthen customer loyalty, add value, introduce new products and gain better communications with the customer, according to CyberCash.

Other questions concern affiliate rulings governing interactions between a utility and its marketing subsidiary and how much information can be shared.

"Some states" (affiliate rules) are drastic, such as California," says IBM's Ryan." Others are more gray or almost nonexistent. The California Public Utilities Commission and their whole deregulation plan creates more than a Chinese wall. It's more of a solid wall between the two entities. So these entities have little capital and few customers, even though their parent may have three million customers. They're looking for ready-made solutions available on a pay-as-you-go basis."

California regulators quashed a $300-million deal between PG&E Energy Services and NIPSCO for an internal IT package it developed in partnership with IBM.(1) The computer giant learned another hard lesson about selling a product-turned-commodity in a highly competitive, parallel universe where a company is forced to unbundle service and support. Then in an April 1998 turnaround, PG&E contracted directly with IBM for customer enrollment and "relationship management" services.

Earlier in September 1996, Boston Edison Co. announced a $300 million deal to hook up with C-TEC Corp. to provide consolidated bills for energy and telecommunications services to customers in Massachusetts, the first state to deregulate. Under the joint venture, the electric company and the broadband network company planned to offer one bill for services that include local and long-distance telephone, video, high-speed Internet,

energy management, and property monitoring. Nearly two years later, BE spokesman Mike Monahan says two things prevent the concept from materializing. "One, we still don't know if it will be allowed under the rules. Two, we don't know if customers want it."

(1) See, Joseph E Schuler Jr., "Information Technology for Utilities," Public Utilities Fortnightly, Nov. 15, 1997, p. 26.

RELATED ARTICLE: Carrying the Touch for Smart Cards

Regulators say they don't fit the bill

In 1995 Peoples Gas, Light & Coke Co., which provides natural gas service in the Chicago area, launched a field trial of a pay-as-you-go **billing** system that used smart cards.

Similar to a prepaid phone card, the **smart card** contains a computer chip that records customer payments at authorized points of sale and transfers the payment information to the customer's **gas meter** . The meter sounds a warning when cash is running low so the customer can add cash with the **smart card** .

Due to state rules preventing winter cutoffs, Peoples Gas ran the trial with customers who use gas for two or more applications, not including space heating. (See, "A New **Billing** Strategy for a Local Gas Distributor," Public Utilities Fortnightly, Jan. 15, 1997, p.26).

"It lasted about four months and included about 500 customers," says Rodrigo Sierra, Peoples Gas spokesman. "Customers liked the **smart card** concept. They liked being in control of how much gas they paid for. But elected officials did not like residents potentially losing gas service in the middle of a blizzard.

"As you know, when the **smart card** runs out of money, the **gas meter** automatically shuts off," he adds. More than a third of the customers experienced a shutoff, and many of them relit the pilots themselves. Sierra says regulators" did not like the idea of residents relighting pilot lights all over the house."

Siemens Microelectronics Inc. in Santa Clara, Calif., makes the chips for most of the smart cards used today. Joerg Borchert, vice president, Security and Chip Card ICs, says that the cards are widely used in South Africa and England. The South Africa electric utility ESCOM has a serious problem with energy theft. The smart cards allow ESCOM to manage electricity sales in poorer areas.

In England, low-income consumers are used to coin-fed meters and the smart cards are not only a more convenient alternative than feeding coins in the meter, but they eliminate coin-collection costs for the utilities.

Borchert says that 90 percent of the market for smart cards is in prepaid phone cards. About 500 million a year are used, mainly outside the U.S.

"The phone company gets the float on the prepayment, reduces coin collection costs from pay phones and sells ads on the cards," he says. Restrictions on terminating service complicate their use for electricity and gas. Use of the phone cards, particularly in states bordering Canada and Mexico (120 million phone cards are sold in Mexico each year) will increase their popularity in the U.S. Smart cards may catch on in the U.S. as a payment medium in special applications, such as charging meters for electric vehicles, or payment for electric and gas service at vacation rental houses.

RELATED ARTICLE: EnergyOne Provides a Lesson

Though short-lived, venture found need for sophisticated **billing** .

Saville Systems of Burlington, Mass. scored a short, lived coup last November when it announced a $1 O-million, six-year contract with EnergyOne to provide convergent **billing** services. EnergyOne planned to market long-distance and local telephone service, home security and other non-energy products and services as well as natural gas and electricity. To accomplish all these tasks, they needed a sophisticated **billing** system.

Unfortunately for Saville, EnergyOne, a 50-50 joint venture of UtiliCorp United and PECO Energy Co., disbanded this spring.

According to Paul Morris, formerly chief marketing officer of EnergyOne in Kansas City, Mo., the joint venture had decided to buy a software package rather than use a legacy system from the joint venture partners because the older **billing** systems couldn't handle the expanded geographical reach of the new businesses, nor its new products. Criteria for the new system included adaptability to a new business model, cost, scalability (ability to upgrade gradually at incremental cost) and support for convergent applications.

"With the convergent **billing** requirement, it was easier to take a telecommunications **billing** system and convert it to energy than to take an energy billet and convert it for a deregulated environment," Morris says.

EnergyOne also considered **billing** systems designed for **credit card** statements, but found that without major customization, it couldn't provide a customer service representative with the background calculations necessary to answer questions from a customer on the phone, Morris says.

Even with Saville's system, EnergyOne--which was to get its revenues from franchise, royalty and transaction fees from its distributors and suppliers--still needed a separate **billing** system to settle transactions with its trading partners.

In April, UtiliCorp and PECO announced they were "restructuring" the EnergyOne marketing alliance due to the slow pace of evolution in the nationally deregulated market "Due to stranded asset recovery, no retail margins were available," Morris said. Subsidizing electric operations through the other business opportunities was not realistic, so the partners pulled the plug on the alliance.

Saville was able to save part of the sale. PECO in June launched Exelon, its unregulated energy and telecommunications services subsidiary, and decided to use Saville's Convergent **Billing** Package, according to John Hart, marketing vice president at Saville in Burlington, Mass. The system for Exelon will include energy; telecommunications, including Internet service provider fees, long-distance telephony and wireless services for cellular phones and paging; and home convenience services such as home and appliance warranties, security system, electric surge protection and home improvements such as siding, roofing and windows.

SPECIAL FEATURES: illustration; graph
INDUSTRY CODES/NAMES: BUSN Any type of business; OIL Petroleum, Energy Resources and Mining
DESCRIPTORS: Collection (Accounting)--Technique; Electric utilities--Management; Internet--Usage
GEOGRAPHIC CODES: NNUS
GEOGRAPHIC NAMES: United States
PRODUCT/INDUSTRY NAMES: 4910000 (Electric Utilities)
SIC CODES: 4911 Electric services
FILE SEGMENT: LRI File 150
?

Status: Path 1 of [Dialog Information Services via Modem]

Status: Initializing TCP/IP using (UseTelnetProto 1 ServiceID pto-dialog)
Trying 31060000009999...Open

DIALOG INFORMATION SERVICES
PLEASE LOGON:
 ******** HHHHHHHH SSSSSSSS?
Status: Signing onto Dialog
 ****
ENTER PASSWORD:
 ******** HHHHHHHH SSSSSSSS? ********
Welcome to DIALOG
Status: Connected

Dialog level 02.07.19D

Last logoff: 25jul02 07:19:32
Logon file405 29jul02 08:24:24
           *** ANNOUNCEMENT ***
                    ***
--Alerts has been enhanced to allow a single Alert profile to be
stored and run against multiple files. Duplicate removal is available
across files and for up to 12 months. The Alert may be run according
to the file's update frequency or according to a custom
calendar-based schedule. There are no additional prices for these
enhanced features. See HELP ALERT for more information.
                    ***
--U.S. Patents Fulltext (File 654) has been redesigned with
new search and display features. See HELP NEWS 654 for
information.
                    ***
--Dialog NewsRoom is now available. BEGIN NEWSROOM
to use the files in a OneSearch. See NEW FILES RELEASED
(below) for individual file numbers.
                    ***
--Connect Time joins DialUnits as pricing
options on Dialog. See HELP CONNECT for
information.
                    ***
--CLAIMS/US Patents (Files 340,341, 942) have been enhanced
with both application and grant publication level in a
single record. See HELP NEWS 340 for information.
                    ***
--SourceOne patents are now delivered to your
email inbox as PDF replacing TIFF delivery.
See HELP SOURCE1 for more information.
                    ***
--Important news for public and academic
libraries. See HELP LIBRARY for more information.
                    ***
--Important Notice to Freelance Authors--
See HELP FREELANCE for more information
                    ***
For information about the access to file 43 please see Help News43.
***
NEW FILES RELEASED
***Dialog NewsRoom - Current 3-4 months (File 990)
***Dialog NewsRoom - 2001 Archive (File 994)
***Dialog NewsRoom - 2000 Archive (File 995)
***TRADEMARKSCAN-Finland (File 679)
***TRADEMARKSCAN-Norway (File 678)
***TRADEMARKSCAN-Sweden (File 675)
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***Delphes European Business (File 481)
                    ***

RELOADED
***U.S. Patents Fulltext 1976-current (File 654)
***Population Demographics (File 581)
***Kompass Western Europe (File 590)
***D&B - Dun's Market Identifiers (File 516)
***CANCERLIT (File 159)
***TOXFILE (File 156)

REMOVED
***U.S. Patents Fulltext 1980-1989 (File 653)
***Washington Post (File 146)
***Books in Print (File 470)
***Court Filings (File 793)
***Microcomputer Software Guide Online (File 278)
***Publishers, Distributors & Wholesalers of the U.S. (File 450)
***State Tax Today (File 791)
***Tax Notes Today (File 790)
***Worldwide Tax Daily (File 792)

New document supplier
IMED has been changed to INFOTRIE (see HELP OINFOTRI)

>>> Enter BEGIN HOMEBASE for Dialog Announcements <<<
>>> of new databases, price changes, etc. <<<
****
COREFULL is set ON as an alias for 15,9,623,810,275,624,636,621,813,16,160,148,20.
COREABS is set ON as an alias for 77,35,593,65,2,233,99,473,474,475.
COREALL is set ON as an alias for COREFULL,COREABS.
SOFTFULL is set ON as an alias for 278,634,256.
EUROFULL is set ON as an alias for 348,349.
JAPOABS is set ON as an alias for 347.
HEALTHFULL is set ON as an alias for 442,149,43,444.
HEALTHABS is set ON as an alias for 5,73,151,155,34,434.
DRUGFULL is set ON as an alias for 455,129,130.
DRUGABS is set ON as an alias for 74,42.
INSURANCEFULL is set ON as an alias for 625,637.
INSURANCEABS is set ON as an alias for 169.
TRANSPORTFULL is set ON as an alias for 80,637.
TRANSPORTABS is set ON as an alias for 108,6,63.
ADVERTISINGFULL is set ON as an alias for 635,570,PAPERSMJ,PAPERSEU.
INVENTORYABS is set ON as an alias for 8,14,94,6,34,434,7.
BANKINGFULL is set ON as an alias for 625,268,626,267.
BANKINGABS is set ON as an alias for 139.
HEALTHALL is set ON as an alias for COREFULL,COREABS,HEALTHFULL,HEALTHABS.
INSURANCEALL is set ON as an alias for COREFULL,COREABS,INSURANCEFULL,INSURANCEABS.
RESERVATIONALL is set ON as an alias for COREFULL, COREABS.
OPERATIONSALL is set ON as an alias for COREFULL,COREABS,INVENTORYABS.
TRANSPORTALL is set ON as an alias for COREFULL,COREABS,TRANSPORTFULL,TRANSPORTABS.
ADVERTISINGALL is set ON as an alias for COREFULL,COREABS,ADVERTISINGFULL.
SHOPPINGALL is set ON as an alias for COREFULL,COREABS,ADVERTISINGALL,47.
INVENTORYALL is set ON as an alias for COREFULL,COREABS,INVENTORYFULL.
BANKINGALL is set ON as an alias for COREFULL,COREABS,BANKINGFULL,BANKINGABS.
PORTFOLIOALL is set ON as an alias for COREFULL,COREABS,BANKINGALL.
TRADINGALL is set ON as an alias for COREFULL,COREABS,BANKINGALL.
CREDITALL is set ON as an alias for COREFULL,COREABS,BANKINGALL.
FUNDSALL is set ON as an alias for COREFULL,COREABS,BANKINGALL,608.
*** ***
SYSTEM:HOME
Cost is in DialUnits
Menu System II: D2 version 1.7.8 term=ASCII
*** DIALOG HOMEBASE(SM) Main Menu ***

Information:
1. Announcements (new files, reloads, etc.)
2. Database, Rates, & Command Descriptions
3. Help in Choosing Databases for Your Topic
4. Customer Services (telephone assistance, training, seminars, etc.)
5. Product Descriptions

Connections:
6. DIALOG(R) Document Delivery
7. Data Star(R)

/H = Help /L = Logoff /NOMENU = Command Mode

Enter an option number to view information or to connect to an online service. Enter a BEGIN command plus a file number to search a database (e.g., B1 for ERIC).
?b corefull,coreabs

29jul02 08:24:32 User242933 Session D103.1
$0.00 0.168 DialUnits FileHomeBase
$0.00 Estimated cost FileHomeBase
$0.03 TELNET
$0.03 Estimated cost this search
$0.03 Estimated total session cost 0.168 DialUnits

SYSTEM:OS - DIALOG OneSearch
File 15:ABI/Inform(R) 1971-2002/Jul 26
(c) 2002 ProQuest Info&Learning
***File 15: Alert feature enhanced for multiple files, duplicate** removal, customized scheduling. See HELP ALERT.
File 9:Business & Industry(R) Jul/1994-2002/Jul 26
(c) 2002 Resp. DB Svcs.
File 623:Business Week 1985-2002/Jul 26
(c) 2002 The McGraw-Hill Companies Inc
File 810:Business Wire 1986-1999/Feb 28
(c) 1999 Business Wire
File 275:Gale Group Computer DB(TM) 1983-2002/Jul 29
(c) 2002 The Gale Group
File 624:McGraw-Hill Publications 1985-2002/Jul 26
(c) 2002 McGraw-Hill Co. Inc
File 636:Gale Group Newsletter DB(TM) 1987-2002/Jul 29
(c) 2002 The Gale Group
File 621:Gale Group New Prod.Annou.(R) 1985-2002/Jul 29
(c) 2002 The Gale Group
File 813:PR Newswire 1987-1999/Apr 30
(c) 1999 PR Newswire Association Inc
File 16:Gale Group PROMT(R) 1990-2002/Jul 29
(c) 2002 The Gale Group
***File 16: Alert feature enhanced for multiple files, duplicate** removal, customized scheduling. See HELP ALERT.
File 160:Gale Group PROMT(R) 1972-1989
(c) 1999 The Gale Group
File 148:Gale Group Trade & Industry DB 1976-2002/Jul 29
(c)2002 The Gale Group
***File 148: Alert feature enhanced for multiple files, duplicate** removal, customized scheduling. See HELP ALERT.
File 20:Dialog Global Reporter 1997-2002/Jul 29
(c) 2002 The Dialog Corp.
***File 20: Alert feature enhanced for multiple files, duplicate** removal, customized scheduling. See HELP ALERT.
File 77:Conference Papers Index 1973-2002/Jul
(c) 2002 Cambridge Sci Abs
File 35:Dissertation Abs Online 1861-2002/Jun
(c) 2002 ProQuest Info&Learning
File 593:KOMPASS Central/Eastern Europe 2002/Jun
(c) 2002 KOMPASS Intl.
File 65:Inside Conferences 1993-2002/Jul W3
(c) 2002 BLDSC all rts. reserv.
File 2:INSPEC 1969-2002/Jul W4
(c) 2002 Institution of Electrical Engineers
***File 2: Alert feature enhanced for multiple files, duplicates**

removal, customized scheduling. See HELP ALERT.
  File 233:Internet & Personal Comp. Abs. 1981-2002/Aug
         (c) 2002 Info. Today Inc.
  File 99:Wilson Appl. Sci & Tech Abs 1983-2002/Jun
         (c) 2002 The HW Wilson Co.
  File 473:FINANCIAL TIMES ABSTRACTS 1998-2001/APR 02
         (c) 2001 THE NEW YORK TIMES
***File 473: This file will not update after March 31, 2001.**
It will remain on Dialog as a closed file.
  File 474:New York Times Abs 1969-2002/Jul 27
         (c) 2002 The New York Times
  File 475:Wall Street Journal Abs 1973-2002/Jul 26
         (c) 2002 The New York Times

      Set Items Description
      --- ----- -----------
?s ((utility or gas or electric or water) (w) meter) and (credit or debit or visa or ma
stercard or (smart (w) card))
Processing
Processed 10 of 23 files ...
Processing
Processed 20 of 23 files ...
Completed processing all files
         1152813 UTILITY
         3049816 GAS
         2448057 ELECTRIC
         2499031 WATER
          216070 METER
            6177 (((UTILITY OR GAS) OR ELECTRIC) OR WATER)(W)METER
         2791122 CREDIT
          150272 DEBIT
          211315 VISA
          107256 MASTERCARD
          673910 SMART
         1456565 CARD
           83036 SMART(W)CARD
      S1   524 ((UTILITY OR GAS OR ELECTRIC OR WATER) (W) METER) AND
                  (CREDIT OR DEBIT OR VISA OR MASTERCARD OR (SMART (W)
                  CARD))
?s s1 and (communication
>>>Unmatched parentheses
?s s1 and communication and central and billing
           524 S1
       1909038 COMMUNICATION
       4024691 CENTRAL
        372407 BILLING
      S2   18 S1 AND COMMUNICATION AND CENTRAL AND BILLING
?type s2/3,ab/all
>>>No matching display code(s) found in file(s): 65, 593, 623-624, 810, 813

2/3,AB/1   (Item 1 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
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01400506 00051493
Understanding our industry future
Mason, Bob
Management Quarterly v37n4 PP: 20-31 Winter 1997 ISSN: 0025-1860
JRNL CODE: MQU
WORD COUNT: 5623

ABSTRACT: Possible distribution restructuring scenarios and the strategies utilities are currently pursuing in their drive for ownership of the customer are detailed. The investor-owned utility (IOU) view of customers is based on 2 parameters: revenue and mobility. New customer strategies of IOU's include: 1. key-customer marketing, 2. securing services, 3. branding, 4. capture via alternative fuels, 5. non-core business, and 6. communications. A comparative analysis of the bundled and the new unbundled distribution system is provided.

2/3,AB/2 (Item 2 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

01187278 98-36673
Emerging competition in gas
Ouseley, Rachel
Consumer Policy Review v6n2 PP: 53-59 Mar/Apr 1996 ISSN: 0961-1134
JRNL CODE: CPW
WORD COUNT: 5669

ABSTRACT: On April 29, 1996, gas companies will be able to compete for domestic customers in the southwest of England: this is the first trial for full competition, which will be phased in by 1988. A complex system of licenses and codes has been set up, but potential pitfalls remain. Concerns remain about the scope for anti-competitive practices and the limited powers of the regulator. It has also been suggested that some consumers will benefit at the expense of other, less commercially attractive customers.

2/3,AB/3 (Item 3 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)

00896753 95-46145
CONVERSANT VIS listens and talks to your customers
Cordom, Christopher; Searles, Kendall S
AT&T Technology v9n2 PP: 22-25 Summer 1994 ISSN: 0889-8979 JRNL CODE: ATT
WORD COUNT: 2109

ABSTRACT: For several years, the leader in interactive-voice-response technology has been AT&T's CONVERSANT Voice Information System (VIS). Based on its multi-application platform, which provides open interfaces to other systems, software and communications networks, the CONVERSANT VIS gives customers extraordinary capabilities and performance. With growth from 4 to 48 telephone channels, text-to-speech conversion, call-classification analysis, and a simplified way to generate its applications, the CONVERSANT VIS is continually being enhanced to meet customers' needs. Two public utilities - Washington Gas of Washington, DC, and Union Electric of St. Louis - have successfully implemented several voice applications on their CONVERSANT Systems to improve service not only to their customers, but also to their own employees. Details are provided.

2/3,AB/4 (Item 1 from file: 810)
DIALOG(R)File 810:Business Wire

0628965 BW1046

GREENLAND: Greenland Corp. signs agreement to raise capital

October 02, 1996

Byline: Business Editors

2/3,AB/5 (Item 1 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

02418243 Supplier Number: 59610667

Connect One And NAMS Create the World's First Dial-Up Energy Meter That Sends and Receives E-Mail Without a Gateway.
Business Wire, p0004
Feb 23, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 1099

2/3,AB/6 (Item 2 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

01434157 Supplier Number: 46768073
Greenland Corp. signs agreement to raise capital.
Business Wire, p10021046
Oct 2, 1996
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 387

2/3,AB/7 (Item 1 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)

07072430 Supplier Number: 59610667
Connect One And NAMS Create the World's First Dial-Up Energy Meter That Sends and Receives E-Mail Without a Gateway.
Business Wire, p0004
Feb 23, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 1099

2/3,AB/8 (Item 2 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)

04601774 Supplier Number: 46768073
Greenland Corp. signs agreement to raise capital.
Business Wire, p10021046
Oct 2, 1996
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 387

2/3,AB/9 (Item 1 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

12747456 SUPPLIER NUMBER: 66529363 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Pilot test of electric pay-for-use meters may alter U.S. practices.(Brief Article)
D'Zurko, Daphne C.; Gershman, Albert W.
Pipe Line & Gas Industry, 83, 10, 33
Oct, 2000
DOCUMENT TYPE: Brief Article ISSN: 1079-8765 LANGUAGE: English
RECORD TYPE: Fulltext
WORD COUNT: 3326 LINE COUNT: 00273

2/3,AB/10 (Item 2 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

12123437 SUPPLIER NUMBER: 59610667 (USE FORMAT 7 OR 9 FOR FULL TEXT)

Connect One And NAMS Create the World's First Dial-Up Energy Meter That Sends and Receives E-Mail Without a Gateway.
Business Wire, 0004
Feb 23, 2000
LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 1096 LINE COUNT: 00094

2/3,AB/11 (Item 3 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

09837174 SUPPLIER NUMBER: 19623932 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Understanding our industry future. (electric utility industry)(Industry Overview)
Mason, Bob
Management Quarterly, v37, n4, p20(12)
Wntr, 1997
DOCUMENT TYPE: Industry Overview ISSN: 0025-1860 LANGUAGE: English RECORD TYPE: Fulltext; Abstract
WORD COUNT: 6178 LINE COUNT: 00506

ABSTRACT: An understanding of the workings of the electric utility industry is necessary for predicting its future directions. Its biggest players are Investor-Owned Utilities (IOUs), which are primarily motivated to generate profits and margins for their shareholders. They are likely to pursue additional market share by generating more business from their existing customers, looking for new growth in their area and going after the customer base of another utility. To secure future new customers, IOUs are implementing aggressive strategies such as key-customer marketing, securing services as an Energy Services Company, branding, capturing customers through alternative fuels, entering non-core businesses, and communicating with customers.

2/3,AB/12 (Item 4 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

09003554 SUPPLIER NUMBER: 18740954 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Greenland Corp. signs agreement to raise capital.
Business Wire, p10021046
Oct 2, 1996
LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 412 LINE COUNT: 00037

2/3,AB/13 (Item 5 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

08777451 SUPPLIER NUMBER: 18378507 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Products and services. (part 10, from Water Meters, Residential through Miscellaneous)(1996 Municipal Index Special issue)(Directory)
American City & County, v111, nSPEISS, p288(9)
April 30, 1996
DOCUMENT TYPE: Directory ISSN: 0149-337X LANGUAGE: English
RECORD TYPE: Fulltext; Abstract
WORD COUNT: 10068 LINE COUNT: 00893

ABSTRACT: In this section of the purchasing guide for municipalities, products and services are listed alphabetically. Under each product entry are the names of companies, a brief description of services if applicable, and locator information.

2/3,AB/14 (Item 6 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

08124425 SUPPLIER NUMBER: 17389671 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Plastics technology: manufacturing handbook & buyers' guide 1995/96.(Buyers Guide)
Plastics Technology, v41, n8, pCOV(941)
August, 1995
DOCUMENT TYPE: Buyers Guide ISSN: 0032-1257 LANGUAGE: English
RECORD TYPE: Fulltext
WORD COUNT: 174436 LINE COUNT: 15187

2/3,AB/15 (Item 7 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

07704260 SUPPLIER NUMBER: 16447767 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Wireless '95. (Cellular Telecommunications Industry Association 10th annual Convention and Exposition scheduled for FEbruary 1-3, 1995 at the Ernest N. Morial Convention Center in New Orleans, Louisiana)
Cellular Business, v12, n2, p24(60)
Feb, 1995
ISSN: 0741-6520 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
WORD COUNT: 31135 LINE COUNT: 03166

2/3,AB/16 (Item 8 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

07580746 SUPPLIER NUMBER: 15834735 (USE FORMAT 7 OR 9 FOR FULL TEXT)
The meter industry adopts advanced technologies.
Beaty, Wayne
Electric Light & Power, v72, n10, p21(3)
Oct, 1994
ISSN: 0013-4120 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT; ABSTRACT
WORD COUNT: 2779 LINE COUNT: 00228

ABSTRACT: Advanced metering technologies include the use of handheld computers, real-time data processing software, submetering, automatic meter reading through telephone networks and power line carrier systems. Advanced energy management systems that have been installed at electric utilities throughout the US are discussed. Some systems have even installed radio frequency **communication** systems.

2/3,AB/17 (Item 9 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

04912484 SUPPLIER NUMBER: 09213298 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Gas measurement: product range increasing. (survey of equipment for gas measurement; includes brief descriptions of corporate products)
Gas World, v195, n4862, p10(5)
Oct, 1990
ISSN: 0308-7654 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
WORD COUNT: 6158 LINE COUNT: 00517

2/3,AB/18 (Item 10 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

04567356 SUPPLIER NUMBER: 08901409 (USE FORMAT 7 OR 9 FOR FULL TEXT)
New metering technology. (remote electric metering equipment)
Hutt, Peter
Electrical Review, v223, n4, p48(2)
Feb 21, 1990
ISSN: 0013-4384 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
WORD COUNT: 1370 LINE COUNT: 00115

?type s2/3,9/16

2/9/16 (Item 8 from file: 148)

07580746 SUPPLIER NUMBER: 15834735 (THIS IS THE FULL TEXT)
The meter industry adopts advanced technologies.
Beaty, Wayne
Electric Light & Power, v72, n10, p21(3)
Oct, 1994
ISSN: 0013-4120 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT; ABSTRACT
WORD COUNT: 2779 LINE COUNT: 00228

ABSTRACT: Advanced metering technologies include the use of handheld computers, real-time data processing software, submetering, automatic meter reading through telephone networks and power line carrier systems. Advanced energy management systems that have been installed at electric utilities throughout the US are discussed. Some systems have even installed radio frequency **communication** systems.

TEXT:

Metering products and techniques have changed significantly and utilities are quick to integrate them into system operations. Some of the advanced metering technology that is currently being used in the industry involves not only the meters themselves, but advanced ancillary equipment such as:

handheld computers--used for many meter **communication** applications ranging from programming devices for electronic metering to fully integrated electronic metering systems;

* telephone networks--used for automatic meter reading (AMR) and data communications;

* power line carrier (PLC) systems--used very successful in Europe. Utilities can establish a direct two-way **communication** link with customers and manage the system remotely;

* fixed network with radio frequency--has created a lot of interest among utilities. Motorola has installed a majority of utility RF **communication** systems in North America. Many of these have excess capacity that can be used for meter communications at non-peak hours, eliminating the need for a dedicated **communication** infrastructure;

* submetering--found mainly in Europe and some large American cities. **Communication** system can retrieve gas, water, electricity and heat metering data; and

* software--used for real-time data processing, analysis and diagnostics.

Portable DSM meter

PSI Energy is heavily involved in demandside management (DSM) and energy conservation programs. Larry Conrad, Technical Services manager, said, "Accurate measurements are necessary to determine how to verify DSM results. Monitoring through metering gives us that 'hard data' to verify savings."

"We take portable meters to the customer site. They are especially useful in determining the efficiencies of an adjustable speed drive (ASD). Traditional air flow controls include dampers with constant speed motor. If the application requires air flow that varies significantly, the load on the constant speed motor will also vary. A portable meter confirms the variation," Conrad said.

"In the case of a fan driven by a 100-hp, 480-V motor, three voltage leads and two current probes are connected to the voltage supply at the motor control center from the portable meter. The meter records energy profile information for a week or longer to see how the motor really operates to capture the variation." The data is used to determine energy savings from the ASD and removal of the damper. If the economics support the project, DSM incentives are offered to support the work.

PSI Energy also uses metered data to demonstrate the advantages of what has come to be called the "negawatt" produced by the "DSM generator." To determine savings, the old energy profile is compared with the new one. "A potential problem," said Conrad, "is finding the right portable meter. Many older ones weigh up to 30 pounds and often require an external power

source and used proprietary software. Safety has also been a concern. Switchgear had to be left open for days to provide access to voltage and current probes."

PSI Energy worked with ABB Power T&D Co. to produce the Portable Alpha meter (Figure 1). It weighs less than three pounds and is small enough to fit in a shoulder bag. These new meters are self powered and use a standard meter-computer interface. The software is compatible with MV90 software (available from Utility Translation Services), which allows communications with most utility meters. The meter achieves local **communication** via an optical port and remote **communication** via an external telephone modem.

[CHART OMITTED]

"The Portable Alpha has helped us reduce onset setup time from hours to minutes and we can save the recorded data for years, even when the meter is not in use," Conrad said.

Variable energy pricing

American Electric Power (AEP), one of the nation's largest holding companies, is installing a new advanced energy management system tht was produced from components by the Electronic Metering and Control Division of ABB Power T&D Co. and Southern Company Services and will be integrated into a package by Integrated Communications Systems Inc., Atlanta, Ga. ICC is marketing the new system under the trade name TranstexT.

After two years of successful field testing in 485 homes in Indiana, Ohio and Virginia, AEP is purchasing the first complete system for use in approximately 25,000 residences in Ohio, Virginia, West Virginia, Kentucky, Indiana, Michigan and Tennessee. "This marks the first commercial offering of variable energy pricing by an electric utility for its residential customers. TranstexT currently is the only advanced energy management system that is capable of supporting this innovative energy pricing strategy," according to Ray Spratlin, ICS president.

The TranstexT system includes an intelligent **electric meter** , a ComSet 200, a water heater controller, a pool pump controller (all manufactured by ABB's Electronic Metering and Control Division) and a smart thermostat/controller made by Johnson Controls Inc. for heating and cooling systems and small appliances. Designed for installation in both new and existing homes without special wiring, the system also provides remote meter reading. Using the TranstexT system, the utility communicates, via the ComSet 2000, the time-variable rate information to the ABB Alpha meter.

This information then is provided via power line carrier to the thermostat/controller. The consumer programs the system, via the thermostat, to automatically adjust heating and cooling settings, water heating and other electric appliances based on electricity prices over time. The new system will provide variable energy pricing with a convenient means for consumers to respond to the pricing, month-to-date and projected energy bill displays to consumers, and remote meter reading.

Remote disconnects

Boston Edison Co. is involved in a project with Metricom Inc. with 15,000 service-disconnect meters (SDMS) Boston Edison is using the meters in part to satisfy the Public Utility Commission's (PUC) mandate to reduce losses attributed to non-payment of utility bills. The SDMS meters are the first to enable an electric utility to remotely turn on and off a residential meter. That capability, beyond satisfying the PUC, creates both economic and operational efficiencies for the utility. The meters used in this project are manufactured by Landis & Gyr and use Metricom's **communication** interface.

Meters with active intelligence

Schlumberger's Vectron solid-state meter is a third-generation analog-to-digital meter. It provides low-cost demand, time-of-use and mass memory data for commercial and industrial polyphase applications. Vectron meters use SiteScan active intelligence to look beyond meter terminals and diagnose loads. In Toolbox mode, SiteScan analyzes and displays site voltages, currents and phase angles. It reports the number of times any of four diagnostic triggers are tripped--signifying when something is wrong.

In the diagnostic mode, the meter records and reports any of four installation conditions: polarity, cross-phase and energy flow; phase voltage verification; inactive phase current verification; and phase power factor. It's designed to provide revenue protection against faulty installations, system loading, tampering, dc problems and more.

Schlumberger's Fulcrum SQ400 (Figure 2) is used for measuring energy

and demand at distribution substations and feeders. It allows for up to 76 displays to be programmed using PC Windows-based programming software. Nonvolatile memory is used to store programming and register data information. Other features can be added such as load profile recording and dual-port data communications. Real-time data can be used as an input to supervisory control and data acquisition remote terminal units (SCADA RTUs) for system monitoring. Schlumberger is a major supplier of AMR systems. It formed a joint venture with Motorola to provide world-class capabilities in radio frequency technologies.

[CHART OMITTED]

Multifunction solid-state meter

The Mark V solid-state meter from TransData Inc., Richardson, Texas, incorporates advanced features such as vector analysis, true root-mean-square power measurement, harmonic distortion detection, capacitor bank control, control/status inputs and outputs and a digital transducer communications port to provide real-time data to the RTU for SCADA and electric and magnetic fields.

Virginia Power uses the Mark V in a number of unique applications. On their intertie and cogeneration metering points, it's used with demand-interval recording and an internal modem for automatic meter reading. In their substation applications (Figure 3), it uses a special six-peak register to record their previous six days of peaks allowing them to replace aging chart recorders. Wolverine Power Cooperative, Cadillac, Mich., uses the Mark V for capacitor control. A present VAR demand threshold is set and allows reactive demand to be compensated on a real-time basis to improve system power factor. Wisconsin Electric Power Co. worked with TransData to design features in the meter for future system requirements. They presently use the meter for large customer **billing** applications because of the true rms power measurement and vector analysis features.

[CHART OMITTED]

Carolina Power and Light Co. is upgrading the metering at intertie points for municipals and cooperatives and large industrial accounts. In the future they plan to use the digital transducer port to feed real-time data directly into the RTU. Both the city of Denton, Texas, and Glades Electric Cooperative are using the dual-circuit totalizing version of the Mark V to retrofit their existing electromechanical dual circuit meters. **Billing** data is retrieved with a laptop PC, handheld PC or through the telephone modem.

Accounting for harmonics

Indianapolis Power and Light Co. and Landis & Gyr Energy Management participated jointly in an experiment intended to illustrate the difference in measured energy consumption provided by three different metering techniques. The diversity of sites permitted capturing various levels of current and voltage harmonics. Harmonics are created by nonlinear loads. Devices such as arc welders, fluorescent lighting ballasts, adjustable speed drives and personal computers and many solid-state devices draw current in short pulses and cause harmonics.

According to the study, customers with nonlinear loads are often undercharged for energy use if they are metered with induction-disc type meters. Although harmonics generally cause at most a few percent error in watthour measurements, the apparent power measured can differ significantly depending upon the method of metering.

The study looked at the traditional two-meter phase-shift system, which would vectorily calculate apparent energy, or by using a single multifunction meter (the Landis & Gyr RDS3 solid-state meter) which calculates kVA directly using digital multiplication rms voltage and current. Another goal of the study was to determine if the time-delay method was an accurate simulation of the traditional phase-shift method to measure kilovolt ampere reactive hour (kVARh). Five application sites were chosen: a supermarket, an insurance office building, an aluminum finishing plant, a steel company and a sewage pump station.

The supermarket measurements showed little difference between kVA phase shift and kVA rms because there was not much harmonic distortion. There was a slight gain in revenue using the rms method--possibly because the solid-state meter has a lower starting watt and a flatter load curve than the electromechanical meter.

The load at the insurance building had a leading power factor which was corrected during the day. The VARh meter detented and so ignored this

leading power factor condition while the RDS meter measured it accurately. Revenue can be increased if this type of load is measured properly. The load at the aluminum company is very cyclical with low consumption during night hours. Again, by properly measuring rms values, the annual revenue could be increased by $2,600.

The steel company has large inducting units for heating steel. There was a large difference between the phase-shift method and the rms method. There could be an increase in revenue because of the increased usage of kWh measured.

The sewage lift station uses variable speed motors and the power factor is better when the motors are running at full speed. When the solid-state controllers slow the motors, harmonics are generated causing the phase-shift method of metering to measure a fictitiously low demand. The power factor calculated from the phase-shift method is 0.99 causing IPALCO to give the customer **credit** , while the true power factor is 0.81.

The increase in revenue for IPALCO using rms metering was $1,176. Measuring by the phase-shift method vs. the rms method, kVAh increased from 690,215 to 747,737 and the average power factor decreased from 0.92 to 0.86. The total increase in revenue from the five sites for IPALCO was $12,528.

According to the study, if harmonics are present, phase-shift or time-delay methods of metering do not accurately measure the kVA delivered to the load. The rms voltage and current method of measuring does accomplish the primary purpose of metering--accurate and complete measurement of kVA so the utility can equitably distribute the cost of generation and distribution.

Fiber optics in metering

Bonneville Power Administration is using the Scientific Columbus JEM1 OVCT with fiber optic sensors to obtain metering signals from high voltage interchange and delivery points where accurate metering is required.

Primary side metering is preferred in many such sites because transformer losses are metered and the metering is not intrusive to the customer's facilities. The JEM1 meter operates from signals obtained from sensor electronics that generate low-level voltage signals for current inputs. It works with both the Balteau and ABB devices.

The Balteau device also uses fiber optic sensors for the voltage signals. The only difference required in the meter is that it is assembled to accept the appropriate signal level for the voltage circuit (2.8 V instead of the standard 120-V instrument transformer secondary).

The OVCT meter uses an analog multiplying technique to measure watts and VARS and provides all the standard features of the JEM1 such as analog, pulse signal outputs, load profile memory and serial communications.

Multipurpose metering system

The Meter Minder, developed by Interactive Technologies Inc., North St. Paul, Minn., allows a utility to automatically read the meters, collect DSM data and report power outages.

It can also offer the homeowner advanced home security protection. The Meter Minder was developed with input from Wright-Hennepin Cooperative Association, Maple Lake, Minn. It was awarded the Most Valuable DSM Product award by the DA/DSM[TM] Conference and Exhibition last January in Orlando, Fla.

It can read up to three meters per location and will interface with most wired pulse initiators. A wireless meter link is expected to be available soon. It has the option of storing usage for each meter in 720 read buffers and can store a 60-day usage history with 12 reads per day.

It tracks outage reporting and can be programmed to report ac power loss. It's programmable to delay the report of the loss from 10 seconds to 30 minutes in 10 second increments. This allows fast outage pinpointing and analysis.

Remote totalizing

New England Electric System is piloting GE's Phase3 meter with telephone modem. Its plan is to replace its current electromechanical totalizing scheme for larger industrial, multi-delivery accounts in the area served by its retail division. The system will allow the utility to do remote totalizing using a **central** computer and eliminate onsite visits. With the new system, which uses the multi-channel recording capability of the Phase3 meter, usage profiles can be obtained by individual delivery site, or by aggregate sites at any time, providing real-time **communication** between the customer and the utility without leaving the office.

"Read only" passwords allow customers to access the data and do their own totalization at any interval to see how energy costs are accumulating at individual sites, or groups of sites, or to take advantage of off-peak rates. Longer range, the utility will look toward using phoneline sharing devices to provide a cellular phone link to the system for those delivery points where there is no hard-wire access and to further decrase telephone costs.

Tom Succi, Meter Operations manager, said the GE Phase3 redundant pulse metering system will help the utility with better DSM of its resources while improving customer service and increasing productivity. This system can help us offer the customer faster, more accurate data and such services as staggered **billing** , tailored to the customer's needs, rather than the meter reading cycle.

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Business needs in both power and gas markets might overcome various technical and regulatory hurdles

Pay-for-use (PFU) meters may eventually offer gas distribution companies the promise of generating revenue from historically payment-troubled customers and the opportunity to make their operations more efficient.

A feasibility study conducted by New York State gas and electric utilities has identified the technology's win-win potential, the size of the collectibles problem, and target customer segments that would make implementation economical.

Using the study as a guide, the utilities have worked together under the direction of the New York Gas Group (NYGAS) to design a pilot test that conforms with consumer protection laws. Regulatory approval in such a large, densely-populated area can advance the U.S. market for electric and gas PFU meters.

Due to available technology, the pilot test will focus on electric meters. By the time the test is completed in 2001 or 2002, it is expected that gas PFU meter technology will be ready for field use.

The concept of PFU gas meters needs both regulatory approval and vendor product development before it can go forward, but the pilot test using electric PFU meters may advance the cause.

Definition. PFU metering systems provide an innovative method for making payment, as well as communicating energy consumption to the consumer. The major components are:

* Programmable meter that can communicate with an ancillary customer display unit to transfer energy consumption information, as well as terminate service

* Customer display terminal (CDT) that provides a digital readout of energy consumption, account balance, as well as service condition information

* One or two-way media for transferring energy credits, such as a card or voucher, to the customer display terminal

* An attended or unattended point-of-sale (POS) device which transfers purchased credits to the card or voucher for a prepaid amount of energy, communicates with a utility customer database system and, for **smart - card** systems, exchanges energy consumption and payment information (Fig. 1).

For some advanced pre-payment systems, the point-of-sale device is unnecessary as a result of direct **communication** between the customer display terminal and the utility database.

The CDT and the meter communicate through power line carrier, radio link, or hard wiring. In some cases, the PFU metering system control is centered in the meter. In others, it is centered in the CDT. Some CDTs are AC-powered, with backup battery; others are strictly battery-powered.

Importance. Why is PFU metering important for gas utilities to consider? In a deregulated energy marketplace, residential customers will have a large positive and negative impact on profitability. Certain types of customers, such as those served under supplier-of-last-resort (SOLR), can end up assuming a disproportionate share of energy costs if bad debt and collections are not managed properly.

In a deregulated market, gas utilities are searching for ways to reduce costs, while providing reliable service and satisfying regulatory and customer requirements. Many utilities, including New York State (NYS) local distribution companies (LDCs), are likely to serve as the SOLR. The cost of serving low-margin customers as the SOLR may be shared among all energy providers. To date, the formula for distributing these costs has not been established.

Every year, hundreds of millions of dollars are either lost, or expended on customers who do not pay their gas bills. In NYS, the cost of bad debt and collection for natural gas service approaches $100 million. Advanced technologies such as PFU meters provide an opportunity to turn a nonpaying customer into a satisfied and responsible customer. Without breakthroughs such as PFU metering, costs on the order of $160 per problem account will continue to add up, prohibiting the SOLRs from reducing energy prices.

PFU deployment. As part of the feasibility study, benefits and barriers were explored for PFU meter deployment in New York, the U.S., and in other parts of the world.

It was found that several million PFU meters have been used successfully in Great Britain, South Africa, Australia, New Zealand, and other countries. At the time of the feasibility study, more than 30 unregulated electric organizations and one regulated gas organization had piloted PFU metering in the U.S. Since then, many more organizations have investigated deploying this technology.

Between Great Britain and South Africa alone, there are more than three million **smart card** or tokenless PFU metering systems deployed. Through interviews with British Gas, it became clear that the technology has enabled payment-troubled customers to become customers who can be offered a **credit** line.

The study also found that 85% of the more than 1.5 million British Gas customers who use PFU gas meters are satisfied. Features that enable budgeting and the ability to pay back arrearages are the most highly rated. Currently, the number of PFU meters being offered to gas customers in Great Britain is approaching 10% of the gas residential customers. (1) Because of its success, the PFU technology continues to evolve, reflecting the need for the customer and utility to communicate on a regular basis.

Customer benefit. PFU metering helps the consumer save energy. Savings range from 5 to 20% of energy usage, based on greater awareness of consumption and associated costs.

Budgeting features offer the payment-troubled customer a tool to manage his or her own affairs. Also, it serves as an "energy bank" that can reduce the anxiety associated with post-paid energy bills of unknown amounts. The customer display terminal serves as a gauge which, like an automobile's speedometer and fuel-tank gauge, provides a value of energy remaining and consumption rate. For customers that have a large percentage of their overall budget consumed using energy, or who operate on a cash basis, the PFUs help them prioritize expenses, and choose when and how much energy to purchase.

Both payment flexibility and energy usage awareness can give PFU customers control over their energy budget. For those who are no longer entitled to utility service due to default on deposit requirements or

payment arrangements, it provides an alternative way to receive energy that otherwise would not be possible.

For those facing service termination, the PFU meter offers an option to payment plans, large deposits, or penalty fees. Finally, an important result is the proven ability of PFU metering to turn a payment-troubled customer into a good customer. This will reduce the overall burden of bad debt and collection on the total residential customer base.

Utility benefit. One major potential benefit for utilities is reducing the cost of collections and bad debt for prior and future arrearages.

The feasibility study found that customers who have payment difficulties and are "problem accounts" cost New York gas and electric utilities over $200 million in lost revenue (Fig. 2). Customers with chronic payment difficulties account for a majority of collection costs, about one third of the bad debt, or about two thirds of the $200 million. The remaining costs and losses are associated with good-pay accounts that fail to pay the last one to three bills prior to moving out of state. These consist primarily of residential rentals, student rentals, and vacation properties with seasonal occupancy.

By providing the customer a tool to manage his or her own affairs, this technology can open a real-time **communication** line, bringing the LDC closer to its customer. Some of the more advanced versions of PFU metering also include customer-messaging features. The technology also streamlines meter reading and collection procedures.

Because payments are made in advance, it provides a more profitable service option to slow-paying customers. With high customer satisfaction, PFUs also can foster positive public relations.

Feasibility study. Starting in 1997, NYGAS focused its efforts on understanding the size of the collectibles problem, the needs of customers with payment difficulties, and the opportunities for deployment.

The first step consisted of the statewide feasibility study. This study included:

* A survey of 23 PFU electric metering pilot programs in the U.S.
* Interviews with key metering, customer service, and management personnel from the electric and gas utilities in NYS
* Consumer focus groups with customers having payment difficulties
* Analysis of state-of-the-art PFU metering technologies
* Economic modeling based on utility-specific costs and problem account data
* Analysis of payment behaviors of customers with payment difficulties
* Investigation of regulatory issues and precedents. (2)

While regulatory discussions started as part of the initial study, they became the subject of extensive follow-up work. This work included areas such as planning for a statewide pilot test, meter system approvals, developing uniform procedures and tariffs for participants in the test, and legal analysis of a key, relevant New York State law, the Home Energy Fair Practices Act (HEFFA).

Pilot test. If approved by the New York Department of Public Service (DPS), the pilot test will be conducted in cooperation with more than six New York utilities, using electric meters from multiple vendors. The pilot test is being limited to electric meters at this time, due to available technology offerings. Each utility designated as a piloting utility (some companies are participating as observers) will recruit between 200 and 250 meter volunteers to participate in the test, for up to one year.

Prior to installing PFU metering equipment, each volunteer will have met pre-screened customer segment requirements, and will have completed surveys. The surveys will be used to determine a positive ability to pay, views toward utility energy and **billing** services, payment patterns, whether there are any special circumstances that affect energy service, and to ensure that there are no serious health risks.

Legal considerations. It has been argued that PFU meters place initiation and termination in the hands of the customer, not the utility. These contentions are based on the frequency and level of information provided by the meter's display terminal. These arguments contend that HEFPA applies only to utility-initiated terminations.

To help the test move forward, participating utilities have offered to limit it to a specific market segment. This proposal is designed to convince regulators that PFU metering can create a positive outcome for

payment-troubled customers in terms of satisfaction, energy savings, and better budgeting.

For the initial pilot test, PFU metering is being offered only to former utility customers who are no longer entitled to service. The test will not involve delinquent customers who ultimately pay. The justification for this approach is not entirely economical. It is designed to conform to existing law, and help build confidence as well as comfort with PFU metering. Ultimately, broader customer segments will need to be tried. For volunteers who qualify in this limited category, it presents a respectable and positive way for people to obtain energy service.

As part of the pilot test planning and discussions with state regulators, participating utilities are adding **communication** features for test participants though the PFU metering system. Following signing of a pilot test agreement, the pre-screened pilot test volunteer will receive detailed instructions on equipment operation, the information it provides, and potential for termination.

With each energy purchase, the sales receipt will include a printed notice of rights and responsibilities. Also, while the PFU metering system is in use, audible and visible warnings will be provided when low **credit** balance is reached. An emergency backup card or token will be offered. Also, a help line will be available to the test participant on a 24-hr/day, seven-day week basis. The emergency **credit** is viewed as something that should only be offered on a one-time basis only, so that potential change in behavior can be truly tested.

To date, many of the PFU meter systems used for pilot tests in the U.S. have been by municipal or cooperative utilities. As unregulated entities, they did not have to gain approval from utility commissions. Regulatory approval has been obtained for specific companies in North Carolina and Oregon. If efforts by New York State utilities to gain regulatory approval are successful, a long-standing barrier to widespread PFU meter use in the U.S. will have been overcome.

Planning. The New York DPS, participating utilities, and a number of vendors have been involved in the planning of the New York State pilot test.

Vendors who have made a commitment to the early PFU meter market have played a big role in this process. They have designed programs that meet the test plan being discussed with the DPS, and have instituted features to accommodate special regulatory requests for the pilot, conditions for emergency **credit** , and customer service requirements.

Participating NYGAS members also have worked closely with vendors, to establish laboratory test procedures for the meter and its components. A key requirement is proving that the PFU meter system is accurate, in terms of energy delivered, **credit** registered, and information provided to the customer. While standard test procedures exist, new PFU-metering specific procedures need to be used, confirmed, and accepted by the utilities and the regulators. The utilities have been working with the vendors and the DPS to establish verification procedures.

One of the goals of the pilot test is to establish optimal design specifications for implementing PFU meters. Following the pilot test, the DPS and the participating utilities will determine these specifications after reviewing the data, and discussing the test results. It is envisioned that the vendors will then be able to better serve the electric and gas customers through these specifications.

Gas PFUs. Gas PFU metering technology has not evolved in the U.S. as it has in Europe. This is due to concerns related to automatic shutoff, and related regulatory issues; and the need to re-light the pilot light. As a result, traditional PFU metering systems are not being offered for gas in the U.S.

In recent years, some vendors have looked at adapting successful gas systems from Europe. However, these vendors are holding off until the utilities succeed in gaining widespread regulatory approval. If traditional PFU metering technology were to be offered, the **gas meter** would need to have an integrated shutoff valve, and be intrinsically safe.

If the system were to terminate after all low energy warnings and exhaustion of emergency **credit** , the shutoff valve could not open again, regardless of whether or not new energy **credit** was restored via the **smart card** or token. Rather, a utility service call would be necessary to re-light the pilot, and re-open the shutoff valve. Because of the need for this type of product offering, technologies are being developed to

mitigate problems associated with gas termination and subsequent relight.

At present, these developments are proprietary and cannot be disclosed. The involved NYGAS members are working through participation in the electric pilot tests, and discussions amongst themselves, research collaborators, and vendors to make the integration of gas alternatives more streamlined, and consistent with requirements currently being developed. By the time the electric pilot tests are completed in 2001, it is expected that the gas technology developments will have been proven and ready for field implementation.

Operational changes. The advances made possible through PFU meters may change several operational procedures. If the technology is approved for applications that are economical, these changes could include:

* Reduced meter reading
* Reduced bill preparation and mailing
* Enhanced information systems to track POS transactions
* Reduced collection services and physical visits associated with terminations
* Reduced negotiation and processing of debt repayment agreements
* New opportunities for customer messaging through the POS and CDT
* Advanced meter offerings, including ones with modular pieces that can attach to a base meter unit, thus allowing PFU capability to be easily installed or decommissioned.
* Real-time **communication** and pricing at the CDT, through the longer-term prospect of wireless **communication** .

While many issues need to be studied and addressed, this technology can be a catalyst for significant change in the way that energy companies conduct business.

Future applications. Because of the current high per unit cost of PFU metering systems--an installed cost of more than $350/unit--it is uneconomical to install PFU meters for anyone who wants them free of charge.

There are, however, multiple customer segments that offer an economic payback if identified in a timely fashion. These include customers with payment difficulties, rental properties with highly transient tenants, vacation properties with seasonal occupancies, boat slips, trailer hookups and others.

Also, there is an opportunity to offer the PFU meter as a "green" system to those people who want to save energy, or desire more real-time information on their energy usage. For a green meter offering to be economical, the customer needs to be willing to pay a premium for the system.

Conclusion. Continued discussion, as well as regulatory and possibly legal changes will be necessary before PFU metering can be officially implemented in New York State.

Pursuit of this opportunity is warranted because of the large potential benefits it can bring. With deregulation, technologies such as PFU meters can provide utilities the quantum leaps necessary to compete successfully, and to address problems that cannot be afforded in the new order.

Collaborative efforts to pilot test and define the best applications for a new technology such as this are a way to reduce risk, and create a better chance for acceptance of new ways of doing business. If applied properly, PFU metering can create a win-win for customer and utility.

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